



REDLINE VERSION



**Safety of laser products –
Part 12: Safety of free space optical communication systems used for
transmission of information**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.260

ISBN 978-2-8322-6559-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	7
3 Terms and definitions	7
4 Requirements	12
4.1 General remarks	12
4.2 Determination of access level	13
4.2.1 General	13
4.2.2 The use of Condition 2.....	13
4.2.3 The use of C7	16
4.3 Impact of using automatic power reduction features	17
4.4 Access level and classification requirements by location type	17
4.4.1 General	17
4.4.2 Requirements for unrestricted locations.....	19
4.4.3 Requirements for restricted locations.....	23
4.4.4 Requirements for controlled locations	24
4.4.5 Requirements for inaccessible space.....	25
4.5 Classification	25
4.5.1 General	25
4.5.2 Automatic power reduction mechanisms (APR).....	26
4.6 Installation protection systems (IPS)	27
4.7 Specular reflections	27
4.8 Organizational requirements	27
4.8.1 Requirements for manufacturers of ready-to-use FSOCS transmitters or turn key systems.....	27
4.8.2 Installation and service organization requirements.....	29
4.8.3 Operating organization requirements	30
Annex (informative) Examples of applications and calculations.....
Annex A (informative) Methods of hazard/safety analysis.....	38
Annex B (informative) Guidance for installing, servicing and operating organizations.....	39
B.1 General Working practices for FSOCSs	39
B.1.1 General	39
B.1.2 General working practices	39
B.1.3 Additional working practices for Class/access level 1M, 2M, 3R, 3B and 4 systems	40
B.2 Education and training	40
Bibliography.....	41
Figure – Link between two widely separated locations
Figure 1 – Commercial structures	18
Figure 2 – Residential areas	19
Figure 3 – Examples of external location types	20
Figure 4 – Class 1M or 2M transmitter near edge of unrestricted rooftop.....	21
Figure 5 – Class 1M transmitter in unrestricted location	22
Figure 6 – Class 3R transmitter in restricted location	24

Table 1 – Restrictions for product classes and access levels	13
Table 2 – Measurement aperture diameters and distances for the default (simplified) evaluation	14
Table 3 – Requirements for warning signs	30

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF LASER PRODUCTS –

Part 12: Safety of free space optical communication systems used for transmission of information

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

DISCLAIMER

This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60825-12 has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment.

This second edition cancels and replaces the first edition published in 2004. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) LEDs have been removed from the scope.
- b) Normative references have been changed to refer the latest edition of the standards.
- c) A description of the Condition 2 measurement and determination method for access level has been added.

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

FDIS	Report on voting
76/616/FDIS	76/617/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all parts of the IEC 60825 series, published under the general title *Safety of laser products*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

SAFETY OF LASER PRODUCTS –

Part 12: Safety of free space optical communication systems used for transmission of information

1 Scope

This part of IEC 60825 provides requirements and specific guidance for the manufacture and safe use of laser products and systems used for point-to-point or point-to-multipoint free space optical data transmission in the wavelength range from 180 nm to 1 mm. This document only addresses the open beam portion of the system. If portions of the equipment or system incorporate optical fibre that extends from the confinements of the enclosure(s), the manufacturing and safety requirements in IEC 60825-42 apply to those portions only. This document does not apply to systems designed for the purposes of transmitting optical power for applications such as material processing or medical treatment. This document also does not apply to the use of systems in explosive atmospheres (see IEC 60079-0).

~~Throughout this part of IEC 60825, light-emitting diodes (LEDs) are included whenever the word “laser” is used.~~

Light-emitting diodes (LEDs) employed by free space optical communication systems (FSOCSs), used for the purpose of free space optical data transmission, do not fall into the scope of this document. This document covers lasers employed by FSOCSs used for the purpose of free space optical data transmission.

~~The objective of this part of IEC 60825 is to~~ This document:

- provides information to protect people from potentially hazardous optical radiation produced by ~~free space optical communication systems (FSOCSs)~~ by specifying engineering controls and requirements, administrative controls and work practices according to the degree of the hazard; and
- specifies requirements for manufacturing, installation, service and operating organizations in order to establish procedures and provide written information so that proper precautions can be adopted.

Because of the nature of FSOCSs, also known as optical wireless or free-air information transmission systems, care ~~must be~~ is taken in their manufacture as well as their installation, operation, maintenance and service to assure the safe deployment and use of these systems. This document places the responsibility for certain product safety requirements, as well as requirements for providing appropriate information on how to use these systems safely, on the manufacturer of the system and/or transmitters. It places the responsibility for the safe deployment and use of these systems on the installer and/or operating organization. It places the responsibility for adherence to safety instructions during installation and service operations on the installation and service organizations as appropriate, and during operation and maintenance functions on the operating organization. It is recognized that the user of this document may fall into one or more of the categories of manufacturer, installer, service organization and/or operating organization as mentioned above.

~~Any laser product is exempt from all further requirements of this part of IEC 60825. This document does not apply to a laser product if classification by the manufacturer according to IEC 60825-1 shows that the emission level does not exceed the accessible emission limit (AEL) of Class 1 under all conditions of operation, maintenance, service, and reasonably foreseeable failure, and it does not contain an embedded laser product.~~

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60825-1:~~1993~~, *Safety of laser products – Part 1: Equipment classification and requirements* ~~and user's guide~~⁴⁾

~~Amendment 1 (1997)~~

~~Amendment 2 (2001)~~

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

⁴⁾ ~~A consolidated edition (1.2) exists comprising IEC 60825-1 (1993) and its Amendments 1 (1997) and 2 (2001).~~

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Safety of laser products –
Part 12: Safety of free space optical communication systems used for
transmission of information**

**Sécurité des appareils à laser –
Partie 12: Sécurité des systèmes de communication optiques en espace libre
utilisés pour la transmission d'informations**



CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Requirements	11
4.1 General remarks	11
4.2 Determination of access level	13
4.2.1 General	13
4.2.2 The use of Condition 2.....	13
4.2.3 The use of C7	16
4.3 Impact of using automatic power reduction features	16
4.4 Access level and classification requirements by location type	16
4.4.1 General	16
4.4.2 Requirements for unrestricted locations.....	18
4.4.3 Requirements for restricted locations.....	22
4.4.4 Requirements for controlled locations	23
4.4.5 Requirements for inaccessible space.....	24
4.5 Classification	24
4.5.1 General	24
4.5.2 Automatic power reduction mechanisms (APR).....	25
4.6 Installation protection systems (IPS)	26
4.7 Specular reflections	26
4.8 Organizational requirements	26
4.8.1 Requirements for manufacturers of ready-to-use FSOCS transmitters or turn key systems.....	26
4.8.2 Installation and service organization requirements.....	28
4.8.3 Operating organization requirements	29
Annex A (informative) Methods of hazard/safety analysis.....	30
Annex B (informative) Guidance for installing, servicing and operating organizations.....	31
B.1 Working practices for FSOCSs.....	31
B.1.1 General	31
B.1.2 General working practices	31
B.1.3 Additional working practices for Class/access level 1M, 2M, 3R, 3B and 4 systems	32
B.2 Education and training	32
Bibliography.....	33
Figure 1 – Commercial structures	17
Figure 2 – Residential areas	18
Figure 3 – Examples of external location types	19
Figure 4 – Class 1M or 2M transmitter near edge of unrestricted rooftop.....	20
Figure 5 – Class 1M transmitter in unrestricted location	21
Figure 6 – Class 3R transmitter in restricted location	23
Table 1 – Restrictions for product classes and access levels	12

Table 2 – Measurement aperture diameters and distances for the default (simplified) evaluation	14
Table 3 – Requirements for warning signs	29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF LASER PRODUCTS –

Part 12: Safety of free space optical communication systems used for transmission of information

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60825-12 has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment.

This second edition cancels and replaces the first edition published in 2004. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) LEDs have been removed from the scope.
- b) Normative references have been changed to refer the latest edition of the standards.
- c) A description of the Condition 2 measurement and determination method for access level has been added.

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

FDIS	Report on voting
76/616/FDIS	76/617/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all parts of the IEC 60825 series, published under the general title *Safety of laser products*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

SAFETY OF LASER PRODUCTS –

Part 12: Safety of free space optical communication systems used for transmission of information

1 Scope

This part of IEC 60825 provides requirements and specific guidance for the manufacture and safe use of laser products and systems used for point-to-point or point-to-multipoint free space optical data transmission in the wavelength range from 180 nm to 1 mm. This document only addresses the open beam portion of the system. If portions of the equipment or system incorporate optical fibre that extends from the confinements of the enclosure(s), the manufacturing and safety requirements in IEC 60825-2 apply to those portions only. This document does not apply to systems designed for the purposes of transmitting optical power for applications such as material processing or medical treatment. This document also does not apply to the use of systems in explosive atmospheres (see IEC 60079-0).

Light-emitting diodes (LEDs) employed by free space optical communication systems (FSOCSs), used for the purpose of free space optical data transmission, do not fall into the scope of this document. This document covers lasers employed by FSOCSs used for the purpose of free space optical data transmission.

This document:

- provides information to protect people from potentially hazardous optical radiation produced by FSOCSs by specifying engineering controls and requirements, administrative controls and work practices according to the degree of the hazard; and
- specifies requirements for manufacturing, installation, service and operating organizations in order to establish procedures and provide written information so that proper precautions can be adopted.

Because of the nature of FSOCSs, also known as optical wireless or free-air information transmission systems, care is taken in their manufacture as well as their installation, operation, maintenance and service to assure the safe deployment and use of these systems. This document places the responsibility for certain product safety requirements, as well as requirements for providing appropriate information on how to use these systems safely, on the manufacturer of the system and/or transmitters. It places the responsibility for the safe deployment and use of these systems on the installer and/or operating organization. It places the responsibility for adherence to safety instructions during installation and service operations on the installation and service organizations as appropriate, and during operation and maintenance functions on the operating organization. It is recognized that the user of this document may fall into one or more of the categories of manufacturer, installer, service organization and/or operating organization as mentioned above.

This document does not apply to a laser product if classification by the manufacturer according to IEC 60825-1 shows that the emission level does not exceed the accessible emission limit (AEL) of Class 1 under all conditions of operation, maintenance, service and reasonably foreseeable failure.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

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

SOMMAIRE

AVANT-PROPOS	36
1 Domaine d'application	38
2 Références normatives	39
3 Termes et définitions	39
4 Exigences.....	44
4.1 Remarques générales	44
4.2 Détermination du niveau d'accès	45
4.2.1 Généralités	45
4.2.2 Utilisation de la condition 2.....	46
4.2.3 Utilisation de C7	49
4.3 Impact des dispositifs de réduction automatique de puissance.....	49
4.4 Exigences de niveau d'accès et de classification par type de zone	49
4.4.1 Généralités	49
4.4.2 Exigences relatives aux zones à accès non limité.....	51
4.4.3 Exigences relatives aux zones à accès limité.....	55
4.4.4 Exigences relatives aux zones à accès contrôlé	57
4.4.5 Exigences relatives à un espace inaccessible.....	58
4.5 Classification	58
4.5.1 Généralités	58
4.5.2 Mécanismes de réduction automatique de puissance (APR)	59
4.6 Systèmes de protection d'une installation (SPI).....	60
4.7 Réflexions spéculaires	61
4.8 Exigences d'organisation	61
4.8.1 Exigences pour les fabricants des émetteurs de SCOEL prêts à l'emploi ou des systèmes clés en main	61
4.8.2 Exigences d'organisation relatives à l'installation et à l'entretien.....	63
4.8.3 Exigences pour l'organisme d'exploitation.....	64
Annexe A (informative) Méthodes d'analyse du danger/de la sécurité	65
Annexe B (informative) Recommandations destinées aux organismes d'installation, d'entretien et d'exploitation	66
B.1 Règles générales de travail pour les SCOEL.....	66
B.1.1 Généralités	66
B.1.2 Règles générales de travail	66
B.1.3 Règles de travail supplémentaires concernant les systèmes de classes/de niveaux d'accès 1M, 2M, 3R, 3B et 4.....	67
B.2 Education et formation	67
Bibliographie.....	68
Figure 1 – Bâtiments commerciaux	50
Figure 2 – Zones résidentielles	51
Figure 3 – Exemples de types de zones externes	52
Figure 4 – Emetteur de classe 1M ou 2M près du bord d'une toiture (terrasse) à accès non limité.....	54
Figure 5 – Emetteur de classe 1M dans des zones à accès non limité	54
Figure 6 – Emetteur de classe 3R dans une zone à accès limité	57
Tableau 1 – Limitations relatives aux classes d'appareils et aux niveaux d'accès	45

Tableau 2 – Diamètres des ouvertures de mesure et distances pour l'évaluation (simplifiée) par défaut	47
Tableau 3 – Exigences relatives aux panneaux d'avertissement	64

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

SÉCURITÉ DES APPAREILS À LASER –

Partie 12: Sécurité des systèmes de communication optiques en espace libre utilisés pour la transmission d'informations

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60825-12 a été établie par le comité d'études 76 de l'IEC: Sécurité des rayonnements optiques et matériels laser.

Cette deuxième édition annule et remplace la première édition parue en 2004. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) Les LED ont été retirées du domaine d'application.
- b) Les références normatives ont été modifiées pour citer les éditions les plus récentes des normes.

- c) Une description de la mesure en Condition 2 et de la méthode de détermination pour le niveau d'accès a été ajoutée.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
76/616/FDIS	76/617/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60825, publiées sous le titre général *Sécurité des appareils à laser*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

SÉCURITÉ DES APPAREILS À LASER –

Partie 12: Sécurité des systèmes de communication optiques en espace libre utilisés pour la transmission d'informations

1 Domaine d'application

La présente partie de l'IEC 60825 donne des exigences et des recommandations spécifiques relatives à la fabrication et à l'utilisation en toute sécurité des appareils à laser et des systèmes employés pour la transmission optique de données en espace libre, d'un point à un autre ou d'un point à plusieurs autres points, dans la plage de longueurs d'onde comprise entre 180 nm et 1 mm. Le présent document ne traite que de la partie du faisceau qui se propage dans un espace ouvert du système. Si des parties de l'équipement ou du système comprennent une fibre optique qui sort des limites de confinement de l'enveloppe ou des enveloppes, les exigences de fabrication et de sécurité de l'IEC 60825-2 ne s'appliquent qu'à ces parties. Le présent document ne s'applique pas aux systèmes conçus dans le but de transmettre un flux énergétique optique pour des applications telles que le traitement des matériaux ou le traitement médical. Le présent document ne s'applique pas non plus à l'utilisation des systèmes en atmosphères explosives (voir l'IEC 60079-0).

Les diodes électroluminescentes (LED) employées par les systèmes de communication optique en espace libre (SCOEL), pour la transmission optique de données en espace libre, ne font pas partie du domaine d'application du présent document. Le présent document couvre les lasers employés par les SCOEL utilisés dans le cadre de la transmission optique de données en espace libre.

Le présent document:

- fournit des informations pour protéger les personnes contre le rayonnement optique potentiellement dangereux produit par les SCOEL, en spécifiant les moyens de contrôle et les exigences techniques, les moyens de contrôle administratif et les règles de travail en fonction du degré de danger; et
- spécifie des exigences à l'usage des organismes assurant la fabrication, l'installation, l'entretien et l'exploitation, afin d'établir des procédures et de fournir des informations écrites, de sorte que des précautions appropriées puissent être prises.

En raison de la nature des SCOEL, également connus sous le nom de systèmes optiques de transmission d'informations sans fil ou à l'air libre, des précautions sont prises lors de leur fabrication comme lors de leur installation, exploitation, maintenance et entretien, pour assurer un déploiement et une utilisation en toute sécurité. Le présent document établit la responsabilité du fabricant du système et/ou des émetteurs vis-à-vis de certaines exigences de sécurité du produit, ainsi que des exigences destinées à fournir des informations appropriées sur la manière d'utiliser ces systèmes en toute sécurité. Il fixe la responsabilité de l'installateur et/ou de l'organisme d'exploitation vis-à-vis du déploiement et de l'utilisation en toute sécurité de ces systèmes. Il définit, comme il convient, la responsabilité des organismes d'installation et d'entretien vis-à-vis de leur respect des instructions de sécurité, pendant les opérations d'installation et d'entretien et de l'organisme d'exploitation vis-à-vis des fonctions d'exploitation et de maintenance. Il est manifeste que l'utilisateur du présent document peut relever d'une ou de plusieurs catégories, celle(s) du fabricant, de l'installateur, de l'organisme d'entretien et/ou de l'organisme d'exploitation, comme mentionnées ci-dessus.

Le présent document ne s'applique pas à un appareil à laser si la classification par le fabricant, selon l'IEC 60825-1, montre que son niveau d'émission ne dépasse pas la limite d'émission accessible (LEA) de la classe 1 dans toutes les conditions d'exploitation, de maintenance, d'entretien et de défaillance raisonnablement prévisible.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60825-1, *Sécurité des appareils à laser – Partie 1: Classification des matériels et exigences*

IEC 60825-2, *Sécurité des appareils à laser – Partie 2: Sécurité des systèmes de télécommunication par fibres optiques (STFO)*