N O R M A I T A L I A N A C E I

Norma Italiana

CEI 76-6

Data Pubblicazione

2012-08

Titolo

Sicurezza degli apparecchi laser
Parte 8: Guida all'uso sicuro dei fasci laser sull'uomo

Title

Safety of laser products

Part 8: Guidelines for the safe use of laser beams on humans

Sommario

Questa Parte della IEC 60825 serve come guida per il datore di lavoro, l'organizzazione responsabile, il tecnico sicurezza laser, l'operatore laser e altre persone coinvolte nell'uso sicuro del laser e dell'apparecchiatura laser di Classe 3B o 4.
Essa riguarda tutte le applicazioni dei fasci laser sull'uomo principalmente in strutture sanitarie, centri estetici e di depilazione e trattamenti dentali, comprese applicazioni mobili e ambito domestico.
Sono descritte le misure di controllo raccomandate per la sicurezza dei pazienti, degli operatori, del personale addetto alla manutenzione. I comandi tecnici che fanno parte dell'apparecchiatura laser o dell'installazione sono brevemente descritti per fornire una comprensione dei principi generali di protezione.
Gli argomenti trattati nella presente guida sono:
- i sistemi di trasmissione del fascio;
- gli effetti biologici della radiazione laser;
- il rapporto di infortuni e situazioni pericolose;
- l'elenco dei controlli.

La Norma in oggetto sostituisce completamente la Norma CEI 76-6:2001-02.
Questa Norma viene pubblicata dal CEI nella sola lingua inglese in quanto particolarmente mirata a settori specialistici.

RAPPORTO TECNICO

DATI IDENTIFICATIVI CEI

Norma italiana	CEI 76-6
Classificazione	CEI 76-6
Edizione	

COLLEGAMENTI/RELAZIONI TRA DOCUMENTI

Nazionali	
Europei	
Internazionali	(IDT) IEC/TR 60825-8:2006-12;
Legislativi	
Legenda	*(IDT) - La Norma in oggetto è identica alle Norme indicate dopo il riferimento (IDT)*

INFORMAZIONI EDITORIALI

Pubblicazione	Rapporto Tecnico
Stato Edizione	In vigore
Data validità	01-09-2012
Ambito validità	Internazionale
Fascicolo	12150 E
Ed. Prec. Fasc.	5928:2001-02
Comitato Tecnico	CT 76-Apparecchiature laser

Approvata da	Presidente del CEI	*In data*	12-07-2012
		In data	
Sottoposta a		*Chiusura in data*	

ICS	31.260; 11.040.99;

TECHNICAL REPORT

IEC TR 60825-8

Second edition
2006-12

Safety of laser products –

Part 8: Guidelines for the safe use of laser beams on humans

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE W

For price, see current catalogue

CONTENTS

FOREWORD 3
INTRODUCTION 5

1 Scope and object 6
2 Normative references 6
3 Terms and definitions 6
4 Hazards, goals and control measures 9
4.1 Risks to eyes 9
4.2 Risks to skin 10
4.3 Fire and burn hazards 11
4.4 Fumes, plumes and vapours 12
4.5 Collateral hazards 13
5 Administrative procedures 13
5.1 LASER SAFETY OFFICER (LSO) 13
5.2 Medical supervision (ophthalmic surveillance) 15
5.3 INCIDENT and ACCIDENT reporting 15
5.4 Maintenance and inspection 16
6 Training recommendations 16
7 Laser environment 17
7.1 The LASER CONTROLLED AREA 17
7.2 Windows 18
7.3 Walls 18
7.4 Fire protection 18

Annex A (informative) Biological effects, hazards, laser equipment technology 19
Annex B (informative) Window shielding 26
Annex C (informative) Checklist for laser installation 27
Annex D (informative) Laser safety training 30
Annex E (informative) Inspection schedule 31
Annex F (informative) Safety issues in laser applications 36

Bibliography 40

Table A.1 – Summary of pathological effects associated with excessive exposure to light 20
Table E.1 – Inspection schedule 33

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF LASER PRODUCTS –

Part 8: Guidelines for the safe use of laser beams on humans

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 60825-8, which is a technical report, 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 1999. It constitutes a technical revision. This second edition, which is the result of continued maintenance work on the previous edition, reflects more thorough consideration of the hazards involved. It also takes into account newer laser technology and laser radiation supply instrumentation, and addresses refined application procedures. Additionally, this second edition implements more recent information available from other standards relevant to safety procedures, which have been revised in recent years. Further technical developments in this area will be reflected on an ongoing basis in future amendments or editions of this technical report.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
76/316/DTR	76/329/RVC

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

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

Terms indicated in small capitals are defined in Clause 3.

A list of all parts of the IEC 60825-8 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 publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

A bilingual version of this technical report may be issued at a later date.

INTRODUCTION

Lasers emit visible and/or invisible optical radiation. In some cases, this radiation is a parallel beam with almost no divergence. This means that the inherently high IRRADIANCE of the laser may be maintained over considerable distances. Because of this, the beam may be focused to a very small area, which may be hazardous to the eye or skin. Annex A includes descriptions of laser systems and some medical applications.

Lasers may present hazards to anyone present during the operation of the laser. Serious risks of injury, in particular to the eye, and/or undesired effects can result from lack of protective measures, the use of faulty laser equipment, misdirected beams or inappropriate laser control settings.

This guide is intended to give direction as to how aspects of laser safety may be incorporated into medical laser practice. Its publication as a technical report indicates that it is not intended to take precedence over existing or proposed national guidance. However, where none exists, this guide should prove helpful.

Although the LASER OPERATOR has direct responsibility for safety during laser use, the employer bears the responsibility for the setting up of a framework for the safe use of the system. This guide strongly advocates the appointment of a LASER SAFETY OFFICER to provide expert advice to the employer and all personnel concerned with the laser operation. This guide emphasizes the need for appropriate laser safety training for all staff involved in providing practical guidance on installation, operation, maintenance and servicing.

SAFETY OF LASER PRODUCTS –

Part 8: Guidelines for the safe use of laser beams on humans

1 Scope and object

This part of IEC 60825 serves as a guide to the employer, the RESPONSIBLE ORGANISATION, the LASER SAFETY OFFICER, the LASER OPERATOR and other persons involved, on the safe use of lasers and laser equipment classified as class 3B or class 4. It covers all applications of laser beams on humans in, but not limited to, health-care facilities, cosmetic and hair removal centres and dental practices, including applications in vehicles and domestic premises.

NOTE Although the scope excludes laser classes lower than class 3B and 4, it is appropriate to state, that particular care should be taken when levels of laser energy are used below the Class 3B and 4 limits when the individual's normal AVERSION RESPONSES are compromised or absent.

This technical report explains the control measures recommended for the safety of patients, staff, maintenance personnel and others. Engineering controls which form part of the laser equipment or the installation are also briefly described to provide an understanding of the general principles of protection.

The subject areas covered in this guide include

– BEAM DELIVERY SYSTEMS;
– biological effects of laser radiation;
– reporting of ACCIDENTS and dangerous situations;
– checklists.

The object of this report is to enhance the protection of persons from laser radiation and other associated hazards by providing guidance on how to establish safety procedures, precautions and user control measures.