

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**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF LASER PRODUCTS –**Part 8: Guidelines for the safe use
of laser beams on humans**

FOREWORD

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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- withdrawn;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.

2 Normative references

The following referenced documents are indispensable for the application 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.

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Reference is also made, as indicated, to individual terms and definitions in IEC 60825-1 and IEC 60601-2-22.

3.1

accident

unforeseen situation which results in an injury to the patient and/or other personnel