

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Safety of laser products –
Part 4: Laser guards**

**Sécurité des appareils à laser –
Partie 4: Protecteurs pour laser**



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INTERNATIONAL
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COMMISSION

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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Requirements for laser guards	11
4.1 Requirement	11
4.2 Design requirements	12
4.3 Performance requirements	12
4.4 Validation	12
4.5 User information	13
5 Proprietary laser guards	13
5.1 General	13
5.2 Design requirements	13
5.3 Performance requirements	13
5.4 Specification requirements	14
5.5 Test requirements	14
5.6 Labelling requirements	14
5.7 User information	15
Annex A (informative) General guidance on the design and selection of laser guards	16
A.1 Design of laser guards	16
A.2 Selection of laser guards	16
Annex B (informative) Assessment of foreseeable exposure limit (FEL)	18
B.1 General	18
B.2 Reflection of laser radiation	19
B.3 Examples of assessment conditions	19
B.4 Exposure duration	22
Annex C (informative) Elaboration of defined terms	25
C.1 Distinction between FEL and PEL	25
C.2 Active guard parameters	25
Annex D (normative) Proprietary laser guard testing	27
D.1 General	27
D.2 Test conditions	27
D.3 Protection time corresponding to the specified protective exposure limit (PEL)	31
D.4 Information supplied by the manufacturer	31
Annex E (informative) Guidelines on the arrangement and installation of laser guards	33
E.1 Overview	33
E.2 General	33
E.3 Risk assessment	34
E.4 Examples of risk assessment	36
E.5 Aids to risk assessment	39
Annex F (informative) Guideline for assessing the suitability of laser guards	42
F.1 Identification of hazards	42
F.2 Risk assessment and integrity	42

F.3	General design	45
F.4	Selection of safeguards	46
F.5	Guard design and construction.....	46
F.6	Guard construction and materials.....	48
F.7	Other safety devices	50
F.8	Interlocking considerations	51
F.9	Environmental considerations	55
F.10	Installation consideration – Environmental factors – Services	56
F.11	Maintenance and service considerations	56
Annex G (normative)	Guided beam delivery systems	67
G.1	General.....	67
G.2	General requirements	67
G.3	Verification of safety requirements or protective measures	69
G.4	Information for users.....	69
G.5	Examples of risk assessments	70
Bibliography		75
Figure B.1	– Calculation of diffuse reflections	19
Figure B.2	– Calculation of specular reflections	19
Figure B.3	– Some examples of a foreseeable fault condition	20
Figure B.4	– Four examples of errant laser beams that might have to be contained by a temporary guard under service conditions.....	21
Figure B.5	– Illustration of laser guard exposure during repetitive machine operation	22
Figure B.6	– Two examples of assessed duration of exposure	23
Figure B.7	– Assessed duration of exposure for a machine with no safety monitoring	24
Figure C.1	– Illustration of guarding around a laser processing machine	25
Figure C.2	– Illustration of active laser guard parameters	26
Figure D.1	– Simplified diagram of the test arrangement.....	29
Figure D.2	– Simplified diagram of the ventilation for the guard under test.....	29
Figure F.1	– Damage resistance of 1 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser.....	57
Figure F.2	– Damage resistance of 1 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser.....	58
Figure F.3	– Damage resistance of 2 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser	58
Figure F.4	– Damage resistance of 2 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser.....	58
Figure F.5	– Damage resistance of 3 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser	59
Figure F.6	– Damage resistance of 3 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser.....	59
Figure F.7	– Damage resistance of 2 mm thick aluminium sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser	59
Figure F.8	– Damage resistance of 2 mm thick aluminium sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser	60

Figure F.9 – Damage resistance of 1 mm thick stainless steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser	60
Figure F.10 – Damage resistance of 1 mm thick stainless steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser	60
Figure F.11 – Damage resistance of 6 mm thick polycarbonate sheet derived from 10 s exposure to a defocused beam during experiments using a CW CO ₂ laser	61
Figure F.12 – Damage resistance of 6 mm thick polycarbonate sheet derived from 100 s exposure to a defocused beam during experiments using a CW CO ₂ laser	61
Figure F.13 – Damage resistance of 1 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	62
Figure F.14 – Damage resistance of 1 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	62
Figure F.15 – Damage resistance of 2 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	63
Figure F.16 – Damage resistance of 2 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	63
Figure F.17 – Damage resistance of 3 mm thick zinc coated steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	64
Figure F.18 – Damage resistance of 3 mm thick zinc coated steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	64
Figure F.19 – Damage resistance of 2 mm thick aluminium sheet derived from 10 s exposure to a defocused beam during experiments using a CW Nd:YAG laser.....	65
Figure F.20 – Damage resistance of 2 mm thick aluminium sheet derived from 100 s exposure to a defocused beam during experiments using a CW Nd:YAG laser.....	65
Figure F.21 – Damage resistance of 1 mm thick stainless steel sheet derived from 10 s exposure to a defocused beam during experiments using a CW Nd:YAG laser.....	66
Figure F.22 – Damage resistance of 1 mm thick stainless steel sheet derived from 100 s exposure to a defocused beam during experiments using a CW Nd:YAG laser	66
Table D.1 – Laser guard test classification.....	30
Table F.1 – Application of ALARP	45
Table G.1 – Beam delivery systems using free space beam delivery systems	70
Table G.2 – Beam delivery systems using fibre optic cables	72

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF LASER PRODUCTS –**Part 4: Laser guards****FOREWORD**

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

This third edition cancels and replaces the second edition published in 2006, Amendment 1:2008 and Amendment 2:2011. This edition constitutes a technical revision.

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

- a) Significant amendments have been included and this edition has been prepared for user convenience.

The text of this International Standard is based on the following documents:

Draft	Report on voting
76/704/FDIS	76/711/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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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.

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

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

SAFETY OF LASER PRODUCTS –

Part 4: Laser guards

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 document applies to all component parts of a guard including clear (visibly transmitting) screens and viewing windows, panels, laser curtains and walls.

In addition, this document indicates

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

NOTE 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.

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

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 60825-1:2014, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

ISO 11553-1, *Safety of machinery – Laser processing machines – Laser safety requirements*

ISO 12100, *Safety of machinery – General principles for design – Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60825-1 and the following apply.